

Regulating Genes Leads to Novel Therapies



Seth Darst

Professor, Head of Laboratory, Laboratory of Molecular Biophysics

CURRENT RESEARCH

RNA polymerase may lead to treatment that will affect patients worldwide

Think back to your high school biology course and you may remember how important RNA is to every living organism. RNA is the blueprint for proteins and is made within cells by a complex molecular machine, the RNA polymerase, in a process called transcription. Dr. Seth Darst, of Rockefeller University, explores the mechanism and regulation of the process of transcription by determining three-dimensional structures of RNA polymerase and associated proteins. Because RNA polymerase is important for all organisms ranging from bacteria to humans, Dr. Darst is able to study the simpler bacterial versions to understand how transcription and gene expression are controlled in more complicated systems. While much of his research is very basic, seeking to understand the structure and mechanism of the RNA polymerase enzyme, applications for the future are numerous. In fact, Dr. Darst's study of tuberculosis is likely to lead to novel therapeutic strategies for tuberculosis treatment. In addition to likely therapeutics for tuberculosis, Dr. Darst's research will allow the development of new therapeutics against a wide range of bacterial pathogens, all of which depend upon RNA polymerase for survival.

Dr. Darst uses many biochemical and biophysical techniques within his laboratory, but uses predominantly X-ray crystallography and cryo-electron microscopy to determine structures of transcription complexes. Using this important variety of techniques, Dr. Darst determined the first high-resolution structure of a cellular RNA polymerase enzyme in 1999. Since, his research has continued to lead the field in innovative and rigorous research as he and his team have made many contributions to the field. While understanding the...

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AFFILIATION



Rockefeller University

EDUCATION

- Ph.D. in Chemical Engineering 1982-1987, Stanford University
- M.S. in Chemical Engineering 1982-1984, Stanford University
- B.S. in Chemical Engineering, Chemical Engineering 1978-1982, University of Colorado, Boulder

AWARDS

- Lucille P. Markey Award in Biomedical Science, 1990-1996
- Career Scientist of the Irma T. Hirschl Charitable Trust, 1994-1999
- Pew Scholar in the Biomedical Sciences, 1995-1999
- American Academy of Microbiology Fellow, 2008
- National Academy of Sciences Fellow, 2008

RESEARCH AREAS

Health & Wellness, Longevity, Immortality Research

FUNDING REQUEST

Your contributions will support the continued research of Dr. Seth Darst, of The Rockefeller University, as he seeks to understand the bacterial transcription process. Donations will support the \$1M per year required for laboratory costs with \$360K allocated specifically to the tuberculosis study. In choosing to donate, you will aid in the development of new therapeutics against a wide range of bacterial pathogens, all of which depend upon RNA polymerase for survival.